



January 30, 2024

**The Regional Municipality of Niagara**  
Planning and Development Services  
1815 Sir Isaac Brock Way, P.O. Box 1042  
Thorold, ON L2V 4T7  
Attention: Sean Norman, PMP, MCIP, RPP

Subject: **Upper's Quarry Final Peer Review Summary - Air Quality**  
Summary of revised Air Quality Assessment Report for the Upper's Quarry in Niagara Falls, Ontario  
Prepared by RWDI Air Inc. for Walker Aggregates Inc., dated July 12, 2023 (RWDI #1603157)  
Englobe #02105316.002

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## 1 Introduction

Englobe Corp. ("Englobe") was retained by the Regional Municipality of Niagara ("the Municipality") to provide a brief memorandum summarizing the latest Air Quality Assessment (AQA) Report for the proposed Upper's Quarry ("the Quarry") in Niagara Falls, Ontario. The AQA Report was prepared by RWDI Air Inc. and presented to the Municipality, with the following primary objectives:

- Determine the worst-case operating scenario for the Quarry from an air quality perspective.
- Calculate the air quality impact on the closest sensitive receptors.
- Compare the calculated, worst-case air quality impact to provincial guidelines.

Please note that this memorandum was prepared with the purpose of summarizing and simplifying the Quarry's latest AQA Report and associated studies with respect to dust emission and its potential impact on nearby receptors, as dust is usually recognized as one of the main issues when it comes to quarry operations.

Some of the terminology and concepts were adapted and/or streamlined in an effort to ease a layperson's comprehension of the AQA Report. Please refer to the original reports for full context and technical terminologies, including descriptions, justifications, and assumptions.

## 2 Project Background

The proposed Quarry is located east of Thorold Townline Rd, west of Beechwood Rd, north of Upper's Lane (by approximately 400 meters), and south of Upper's Lane to the power transmission line right-of-way.

Extraction of aggregate materials within the Quarry will be done in phases, with each phase focusing on a limited area of the overall Quarry limits. The initial phase is located in the southwestern area of the Quarry limits, where the distance to nearby residences is the greatest. Each subsequent phase results in Quarry equipment operating gradually closer to nearby residences.

The operating hours for the Quarry operations is generally Monday to Saturday, from 7am to 7pm. However, a few specific activities are expected to operate 24/7:

- Hauling aggregate materials within the Quarry.
- Shipping and receiving activities.
- Asphalt plant operations.

### 3 Air Quality Standards

As presented in the AQA Report, the primary compound of interest is airborne dust generated by various activities in the Quarry. With respect to air quality studies, dust particulate components are usually divided into three airborne particulate types based on their sizes and effects on human health:

- Total suspended particles, which are particles that can become airborne.
- Coarse particles, small enough to be inhaled into the lungs.
- Fine particles, small enough to be drawn into the alveoli inside the lungs.

The Ontario Ministry of the Environment, Conservation and Parks (“the Ministry”) has published Ambient Air Quality Criteria, which are desirable ambient concentrations of contaminants, including particles, based on protection against adverse effects on health or the environment. Environment and Climate Change Canada also has defined Canadian Ambient Air Quality Standards for certain contaminants, including particles.

Criteria and Standard datasets are used by the Province to implement air quality improvements. They are not enforceable, but rather used as indicators for desirable outdoor air quality conditions.

The Aggregate Resources Act regulations require that dust emissions from quarry operations shall be controlled to make sure that Air Quality Criteria and Standards are respected. For instance, dust suppressants shall be applied as frequently as necessary to control dust emissions from internal haul routes.

### 4 Air Quality Assessment Methodology

The Ministry’s regulatory air quality model AERMOD was used to calculate particle dispersion and to predict the air quality impact of the Quarry on nearby receptors. The model was applied with the regulatory default options. Terrain information and regional meteorological data for the Quarry were downloaded from the Ministry’s website and used within the model in accordance with the Ministry’s Guideline.

The dispersion modeling was performed for the worst-case weather scenario, including maximum wind speed and absence of rainfall that could naturally mitigate dust pollution issues. Wind is a key parameter driving the atmospheric dispersion of fugitive dust around a quarry. The dispersion distance of the dust emitted by quarry operations greatly depends on operating and weather scenarios.

For the Quarry site wind data averaged over several years exhibit prevailing winds from the north-west, west, and south-west.

## **4.1 *Pollution Sources***

Potential particle-generating activities at the Quarry would include:

- Drilling and blasting operations.
- Material crushing, screening, conveying, and stockpiling.
- Material handling operations such as loaders loading trucks.
- Asphalt plant operations.
- Suspension of road dust by vehicle traffic on unpaved surfaces.
- Tailpipe emissions from on-site vehicles and heavy equipment.

The maximum operating scenario examined in the AQA Report reflects the maximum production and shipping operations at the site, based on various types of activities and hours of operations. This scenario is meant to provide an upper range estimate of potential emissions. In all cases, it is expected that operations would realistically occur at levels below these levels over most of the life of the Quarry.

A 95% control efficiency was applied to fugitive dust emissions generated by on-site mobile equipment to account for the effect of dust mitigation measures, such as watering of haul roads, and use of spray bars on processing equipment. This high level of control efficiency of dust emissions is achieved with the combination of measures described in the Best Management Practices Plan (BMPP) for dust and is also supported by the dust control references provided in the Reference section of the AQA Report: a watering rate that would achieve a 95% control efficiency is possible in Southern Ontario with a water application rate of 1.5 liters of water per square meter per hour.

## **4.2 *Sensitive Receptors***

The AQA evaluates the impact of quarry operations on the eleven (11) closest discrete receptors, including homes and businesses, in the area near the Quarry.

During the initial sinking cut operations, potential emission sources would be at the same altitude as the receptors. However, later on, sources associated with peak operations would be all located on the quarry floor, i.e., at a lower altitude than that of the receptors. Dust plumes are therefore expected to be contained within the geographical area of the site and have a limited impact on the closest receptors located higher.

The AQA Report states that due to the nature of the sources of emission, the impact on potential receptors further away, including the residential area southeast of the Quarry, was not assessed, as impacts would decrease rapidly with distance.

# **5 Results and Conclusions**

For all operating phases, concentrations of air pollutants were predicted at the receptor locations. Background particulate concentrations were added to modeling results to calculate the cumulative effect on receptors. Total concentrations were then averaged over different time periods to compare to Air Quality Criteria and Standards.

With additional background concentrations, cumulative effects for all operating phases represent on average 57%, 68%, and 65% of the Ambient Air Quality Criteria and Standards for total suspended particles, coarse particles, and fine particles, respectively. Therefore, with appropriate controls on the haul routes, the predicted

impact on particulate levels for the three size fractions are below Provincial Limits, based on the modelled mitigated emissions applied to the dust dispersion model.

## 6 Recommendations and Proposed Mitigations

The site will have to operate in accordance with the Best Management Practices Plan for dust emissions. Emission estimates calculated in the AQA Report account for the effect of dust mitigation measures including in the BMPP, such as:

- Reducing the vehicle traffic.
- Reducing the speed.
- Improving road design.
- Watering haul roads.
- Covering unpaved roads with gravel.

Additional mitigation measures should be followed:

- Blasting operations occurring within 300 meters of a residential receptor shall have a blast area not exceeding 200 square meters in area.
- Aggregate extraction, processing and shipping does not exceed 9,000 tonnes per day.
- Under dry conditions, water application should be more frequent and watering rate should increase to 1.5 liters of water per square meter per hour.

## 7 Closure

We trust the foregoing will satisfy your present requirements. If you have any questions regarding this matter, please do not hesitate to contact us.

Yours very truly,

**Englobe Corp.**

A handwritten signature in black ink, appearing to read 'D. Lavoué', with a long horizontal flourish extending to the right.

David Lavoué, Ph.D., M.Eng.  
Air Quality Specialist

## Revisions and publications log

REVISION No.	DATE	DESCRIPTION
0A	November 17, 2023	Final Summary Report
0B	January 30, 2024	Revision 1

## Distribution

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